

## **REMARKS**

### ***Status of Claims***

Claims 1, 2, 5-18, 21-22, 25-27, and 30-33 are currently pending. Claims 1, 25 and 32 are independent.

By this amendment, independent claims 1 and 25 have been amended to even more clearly recite and distinctly claim the present methods of removing contamination from a Fischer-Tropsch derived hydrocarbon stream. Support for such amendments can be found at least in the original claims and at page 19, line 30-page 20, line 1 of the specification. As such, no new matter has been added.

Claims 19-20 and 28-29 have been cancelled without prejudice to or disclaimer of the subject matter contained therein.

Applicants respectfully request the Examiner to reconsider and withdraw the outstanding rejections in view of the foregoing amendments and the following remarks.

### ***Claim Rejections Under 35 U.S.C. § 103(a)***

Claims 1, 2, 5-18, 21, 25-27, and 30-31 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Patent No. 2,877,257 ("Cain") in view of U.S. Publication No. 2002/0173556 ("Moore"). Applicants respectfully disagree with this rejection, therefore, this rejection is respectfully traversed.

Cain relates to a process for the purification of hydrocarbon solutions of oxygenated organic compounds comprising acids and which also may contain dissolved or occluded metal contaminants such as iron or iron compounds. (Column 1, Lines 15-19). Cain discloses that the contaminated hydrocarbon products can be produced by synthesis when carbon monoxide and hydrogen are reacted with a promoted iron catalyst. (Col. 1, Lines 26-36). Cain discloses that the product produced from such a process contains dissolved or occluded metal contaminants such as iron or iron compounds. (Col. 1, lines 51-54).

With regard to the purification process, Cain discloses that a crude hydrocarbon synthesis oil is washed with an aqueous acid solution. Such washing produces aqueous acid extract containing *dissolved chemicals including water soluble chemicals, iron salts, and*

*salts of basic nitrogen compounds* and washed primary oil. Washing is repeated until no brown precipitate is produced on the addition of a suitable base to the acid extract. (Figure 2, Column 7, Lines 40-51, and Column 2, Lines 19-25, emphasis added). The *dissolved* chemicals present in the aqueous acid extract are recovered by distillation and the acid returned for use in a subsequent extraction step. (Column 3, Lines 44-47, emphasis added).

Cain further discloses that the oil treated in this manner is then neutralized in a neutralization vessel with an aqueous caustic solution to produce an upper neutral oil layer containing dissolved chemicals. (Figure 2 and Column 2, Lines 36-38). Cain discloses that from the bottom of the neutralization vessel, a rich aqueous soap solution, free of iron and basic nitrogen compounds, is withdrawn. (Column 7, Lines 40-60 and Figure 2).

In contrast, amended independent claims 1 and 25 are directed to methods of removing contamination from a Fischer-Tropsch derived hydrocarbon stream by *precipitating* Al contamination out of a Fischer-Tropsch derived hydrocarbon stream, so that such *precipitated* Al contamination can then be removed through filtration.

According to independent claim 1, as amended, precipitation of Al contamination occurs by contacting the Fischer-Tropsch derived hydrocarbon stream with the aqueous acidic stream in the treatment zone to form a *mixed stream containing Al contamination in particulate form*. Removal of at least a portion of the Al contamination in particulate form occurs by filtering the at least one acidic extracted Fischer-Tropsch derived hydrocarbon stream. Accordingly, the combination of the contacting step and the filtering step substantially reduces plugging of catalyst beds in the hydroprocessing reactor.

According to independent claim 25, as amended, precipitation of Al contamination occurs by extracting Al contamination from the Fischer-Tropsch derived hydrocarbon stream by contacting the Fischer-Tropsch derived hydrocarbon stream with the aqueous acidic stream in the treatment zone at extraction conditions to form a *mixed stream, containing Al contamination in particulate form*, comprising at least one acidic extracted Fischer-Tropsch derived hydrocarbon stream, a modified aqueous acidic stream, and a third phase. Removal of at least a portion of the Al contamination in particulate form occurs by filtering the at least one acidic extracted Fischer-Tropsch derived hydrocarbon stream.

In regard to claim 1, Applicants respectfully submit that Cain does not disclose or suggest contacting the Fischer-Tropsch derived hydrocarbon stream with the aqueous acidic stream in the treatment zone to form a ***mixed stream containing Al contamination in particulate form***. As discussed above, Cain extracts dissolved or occluded iron contamination from crude hydrocarbon synthesis oil with an aqueous acid solution. The acid extract retains the iron contamination in the form of ***dissolved*** chemicals including iron salts. Brown precipitate, including the iron contaminant, forms only upon addition of a suitable base to the acid extract. Accordingly, neither the oil leaving the extractor nor the acid extract contains iron contamination in particulate form or any other metal contamination, such as Al contamination, in particulate form. In contrast, in the method of claim 1, contacting the Fischer-Tropsch derived hydrocarbon stream with the aqueous acidic stream in the treatment zone forms a ***mixed stream containing Al contamination in particulate form***.

In regard to claim 25, Applicants respectfully submit that Cain does not disclose or suggest extracting Al contamination from the Fischer-Tropsch derived hydrocarbon stream by contacting the Fischer-Tropsch derived hydrocarbon stream with the aqueous acidic stream in the treatment zone at extraction conditions to form a ***mixed stream, containing Al contamination in particulate form***, comprising at least one acidic extracted Fischer-Tropsch derived hydrocarbon stream, a modified aqueous acidic stream, and a third phase. As discussed above, Cain extracts dissolved or occluded iron contamination from crude hydrocarbon synthesis oil with an aqueous acid solution. The acid extract retains the iron contamination in the form of ***dissolved*** chemicals including iron salts. Brown precipitate, including the iron contaminant, forms only upon addition of a suitable base to the acid extract. Accordingly, neither the oil leaving the extractor nor the acid extract contains iron contamination in particulate form or any other metal contamination, such as Al contamination, in particulate form. In contrast, in the method of claim 25, extracting Al contamination from the Fischer-Tropsch derived hydrocarbon stream by contacting the Fischer-Tropsch derived hydrocarbon stream with the aqueous acidic stream in the treatment zone at extraction conditions forms a ***mixed stream, containing Al contamination in particulate form***.

Moreover, in regard to claims 1 and 25, Applicants respectfully submit that Cain does not disclose or suggest *filtering the at least one acidic extracted Fischer-Tropsch derived hydrocarbon stream to remove at least a portion of the Al contamination in particulate form*. Cain does not have any use for a filtration step. The oil recovered from the extractor does not contain precipitated contamination. The oil recovered from the extractor is neutralized, but the resulting neutralized oil similarly does not contain precipitated contamination. Rather, Cain's acid extract contains *dissolved* chemicals, including water soluble chemicals, iron salts, and salts of basic nitrogen compounds, which are subsequently recovered by distillation. In contrast, the presently claimed filtering step facilitates removal of Al contamination in particulate form from the at least one acidic extracted Fischer-Tropsch derived hydrocarbon stream. As discussed in the specification, the presently claimed acid extraction processes are desirable as they apparently convert soluble metal contaminants into particulate form and may agglomerate very small particulate contaminants into larger particles, *which may then be removed by filtering*. Page 19, line 30-page 20, line 1.

Moore is merely cited for the propositions that Fischer-Tropsch streams are produced in processes that utilize catalysts such as iron or cobalt catalysts and that Fischer-Tropsch derived streams may be fractionated (i.e. distilled) and hydrotreated. Office Action at page 4. Accordingly, as cited, Moore does not correct the above-noted deficiencies of Cain.

Therefore, for at least the above reasons, withdrawal of the § 103(a) rejection over Cain in view of Moore is respectfully requested.

Claims 19-20, 22, and 28-29 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Cain in view of Moore and further in view of U.S. Patent No. 6,476,086 ("Zhou"). Applicants respectfully disagree with this rejection; therefore, this rejection is respectfully traversed.

Claims 19-20 and 28-29 have been cancelled. As such, the Examiner's rejection of claims 19-20 and 28-29 is now moot. Accordingly, withdrawal of the § 103(a) rejection of claims 19-20 and 28-29 over Cain in view of Moore and Zhou is respectfully requested.

Applicants note that the Examiner cited Zhou against cancelled claims 19-20 and 28-29 in particular for the proposition that Zhou discloses that filtration techniques have been

used to separate solid contaminants from Fischer-Tropsch derived streams. Office Action at page 6. Applicants respectfully assert that the independent claims, as amended, are patentable over Cain in view of Moore and further in view of Zhou.

A *prima facie* case of obviousness requires that there is some teaching, suggestion, or motivation to combine elements of the prior art in the prior art itself, in the nature of the problem, or within the knowledge of a person with ordinary skill in the art. *KSR International Co. v. Teleflex Inc.*, 127 S. Ct, 1727, 1734 (2007). Finally, a *prima facie* case of obviousness requires a reasonable expectation of success in modifying or combining the elements of the prior art to arrive at the claimed invention. M.P.E.P. § 2143.02.

For at least the reasons as explained above, Applicants respectfully submit that Cain in view of Moore does not disclose or suggest the presently claimed methods. As cited, Zhou does not correct the many above-noted deficiencies of Cain in view of Moore.

Moreover, Applicants respectfully submit that one of ordinary skill in the art would not have been motivated to combine Cain, Moore, and Zhou to arrive at the presently claimed methods of independent claims 1 and 25. In particular, Applicants respectfully submit that one of ordinary skill in the art would not have been motivated to combine Cain's acid extraction step with Zhou's disclosure of filtration of catalyst fines to arrive at the presently claimed methods of independent claims 1 and 25. As discussed above, in Cain, the washed oil leaving the extractor does not contain metal contaminants in particulate form. The washed oil is neutralized, but the resulting neutralized oil similarly does not contain metal contaminants in particulate form. Rather, the acid extract contains dissolved chemicals, including water soluble chemicals, iron salts, and salts of basic nitrogen compounds, and is subject to distillation to recover these dissolved chemicals. Thus, in the process of Cain, there is no place where filtration of catalyst fines is necessary. More particularly, in the process of Cain, neither the washed oil leaving the extractor nor the neutralized oil contain particulates that must be filtered out. Thus, one of ordinary skill in the art would not have been motivated to use Zhou's disclosure of filtration in combination with Cain's acid extraction to arrive at the presently claimed methods of claims 1 and 25.

Furthermore, for the same reasons, Applicants respectfully submit that one of ordinary skill in the art would not have had a reasonable expectation of success in combining

Cain's acid extraction step with Zhou's disclosure of filtration of catalyst fines to arrive at the presently claimed methods of independent claims 1 and 25.

Therefore, for at least the above reasons, withdrawal of the § 103(a) rejection of claims 19-20, 22, and 28-29 over Cain in view of Moore and further in view of Zhou is respectfully requested.

Claims 32 and 33 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Cain in view of Moore et al. and further in view of Zhou. Applicants respectfully disagree with this rejection; therefore, this rejection is respectfully traversed.

In the Office Action, the Examiner alleges that it would be obvious to modify the process of Cain by adding acid to the reactor because the *same purification would take place*. The Examiner further alleges that it would be obvious to modify the process of Cain by filtering the product resulting from the extraction step, as suggested by Zhou, because filtering will remove *any solid contaminants*. Office Action at pages 7-8 (emphasis added). Applicants respectfully, yet strenuously, disagree with these allegations of obviousness.

Applicants respectfully submit that modifying the process of Cain by adding acid to the reactor that produces the primary oil would not disclose or suggest to one of ordinary skill in the art the steps of providing an additive to the contents of the Fischer-Tropsch reactor to precipitate soluble contamination within the reactor and filtering the precipitated contamination from the Fischer-Tropsch derived hydrocarbon stream to produce a filtered hydrocarbon stream, as required by independent claim 32. If, as the Examiner alleges, adding acid to the reactor producing the primary oil of Cain results in the *same purification, dissolved chemicals* including water soluble chemicals, iron salts, and salts of basic nitrogen compounds would be present in acid extract in the reactor. Accordingly, the *same purification would not provide particulate contaminants* in the oil produced in the reactor. As such, there would be no need to filter particulate contaminants from the produced oil.

Therefore, for at least the above reasons, withdrawal of the § 103(a) rejection of claims 32 and 33 over Cain in view of Moore and further in view of Zhou is respectfully requested.

***Conclusion***

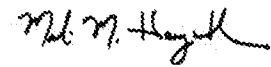
Without conceding the propriety of rejections, the claims have been amended, as provided above, to even more clearly recite and distinctly claim Applicants' methods and to pursue an early allowance. For the reasons noted above, the art of record does not disclose or suggest the inventive concept of the present methods as defined by the claims.

In view of the foregoing remarks, reconsideration of the claims and allowance of the subject application is earnestly solicited. In the event that there are any questions relating to this application, it would be appreciated if the Examiner could telephone the undersigned attorney concerning such arguments so that prosecution of this application may be expedited.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #103904.B500790).

Respectfully submitted,

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